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PROGRESS REPORT

FOR

RESEARCH ON DEVELOPMENT OF
LOW-RESISTANCE p-n JUNCTIONS IN ZnSe

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## DISCUSSION

A re-examination of phosphorus doping was begun under the highest purity conditions possible (buffer layer on undoped substrate, synthetic quartz tube). The ability of the reactor to grow material with similar purity under both hydrogen and argon atmospheres was established. This is important since hydrogen reduction of quartz may contribute to silicon contamination and argon always contains some oxygen which may be an undesirable contaminant. Our previous studies of phosphorus doping had used high concentrations of phosphorus in the melt, but this study was begun with very low concentrations (0.0012 wt. % P) in order to optimize the spectral properties of the material. At this low concentration, no specific features related to phosphorus were seen, but the bound exitons related to Li and Na acceptors as well as the donor-acceptor pair spectrum were quenched. In addition, the $I_a^o$ line, characteristic of high purity material, was enhanced. Work is continuing on attempting to understand these changes and on intermediate and high doping-level experiments to obtain better conducting p-type layers.

In the radiant heated reactor, further support was gained for the model of nitrogen as a shallow acceptor by the observation of the same spectral characteristics in material grown from the vapor phase, using a substrate placed on the tail of the slider.